



Industry &  
Investment



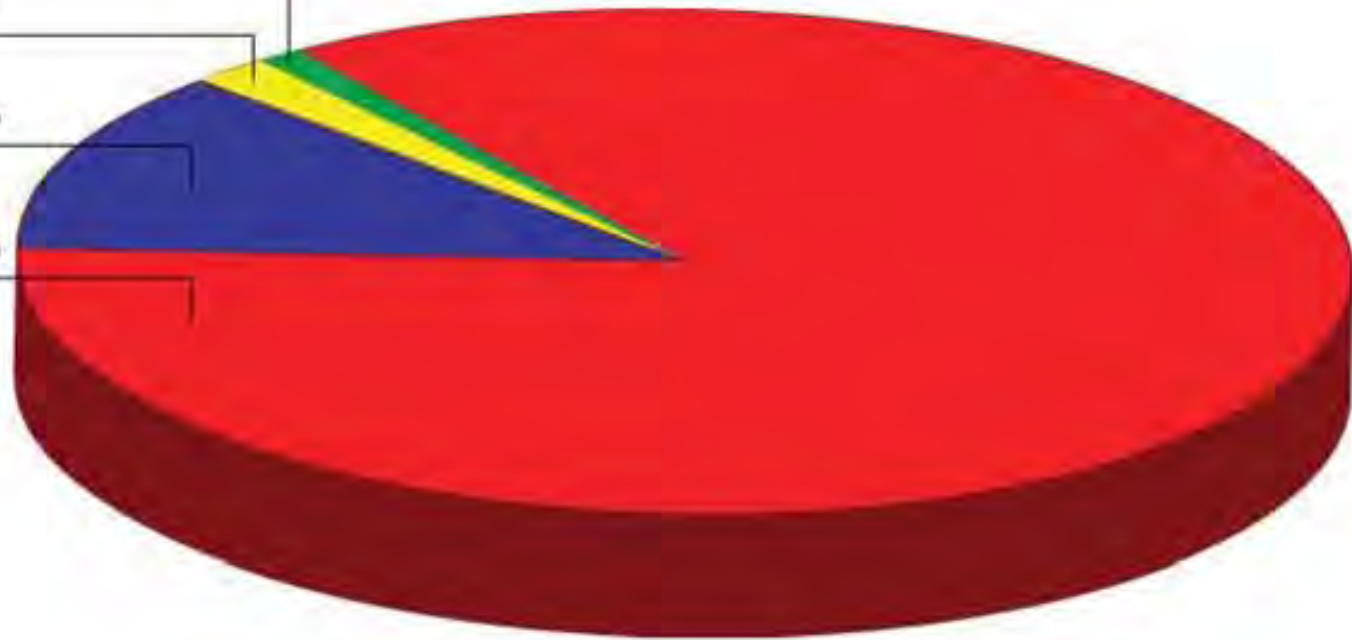
# NEW FRONTIERS EXPLORATION IN NEW SOUTH WALES

Lindsay Gilligan  
Director

Geological Survey of New South Wales

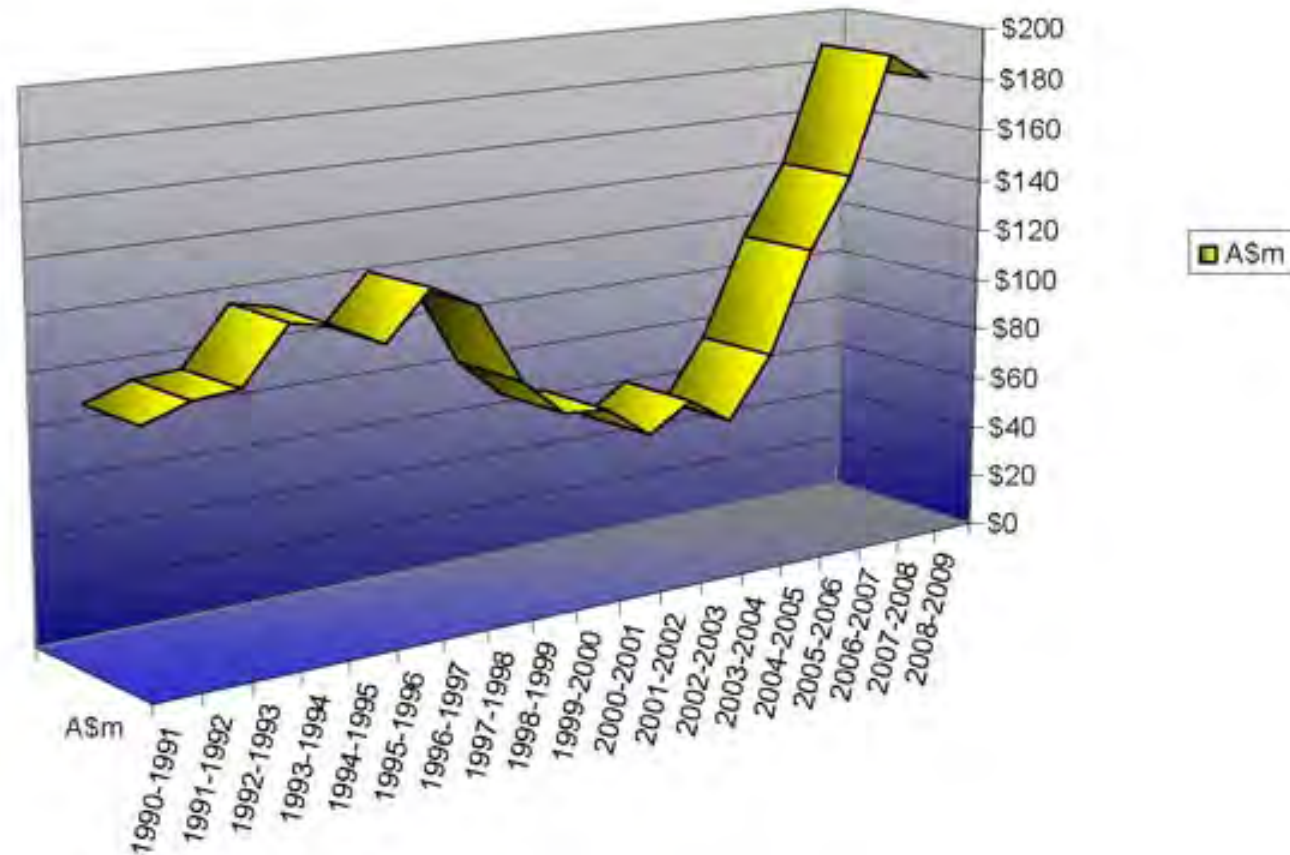
# Value of NSW Mineral Production 2008-09 (preliminary)

|               |     |
|---------------|-----|
| Industrial    | 1%  |
| Construction  | 2%  |
| Metalliferous | 12% |
| Coal          | 85% |

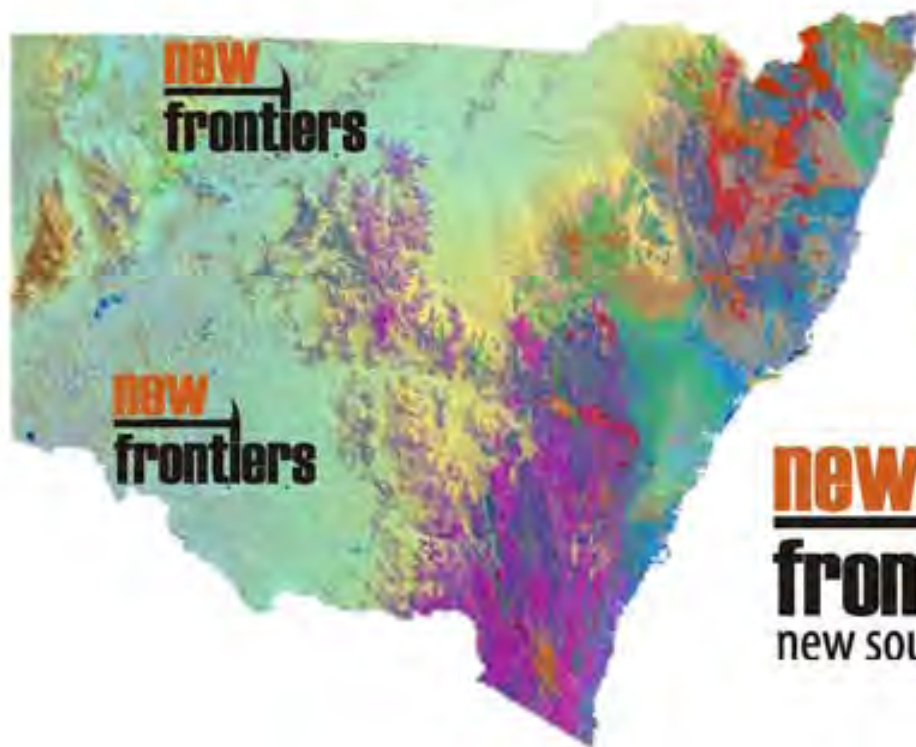


Total A\$25.1 Billion

## NSW Mineral Exploration Expenditure



## NSW Government Initiatives



**DISCOVERY  
2000**

1994 – 2000  
(\$35 million)

**EXPLORATION  
NSW**

2000 – 2006  
(\$30 million)

**new  
frontiers**  
new south wales

I - 2006 – 2008 (\$8 million)

II - 2008 – 2011 (\$16.5 million)

(\$5.5 per year between Minerals,  
Petroleum, Information)

# NSW Mineral Provinces

## Thomson Orogen

New mineral province, potential for:

- Porphyry Au-Cu
- Cobar-type Zn-Pb-Cu-Au



## Delamerian Orogen

- Orogenic Au
- Magmatic Ni
- VMS Cu
- Porphyry Au-Cu

## Curnamona Province

- Giant Broken Hill Zn-Pb
- Iron-oxide copper gold
- Carbonate hosted Zn-Pb
- Magnetite iron ore

## Murray Basin

World-class mineral sands province

## Lachlan Orogen

- World-class porphyry Au-Cu
- Cobar-type Zn-Pb-Cu-Au
- VMS Zn-Pb-Cu
- Lateritic Ni
- Orogenic Au
- Intrusive-related Sn-W-Mo-Au-Cu
- Channel Fe

## New England Orogen

- Intrusive-related Sn-W-Mo-Au
- Orogenic Au-Sb

**Sil. Sed. Cu-  
Au-Zn-Pb**

**Dev. Intrusive-  
related  
Sn-W**

**Ord. Besshi VMS Cu**

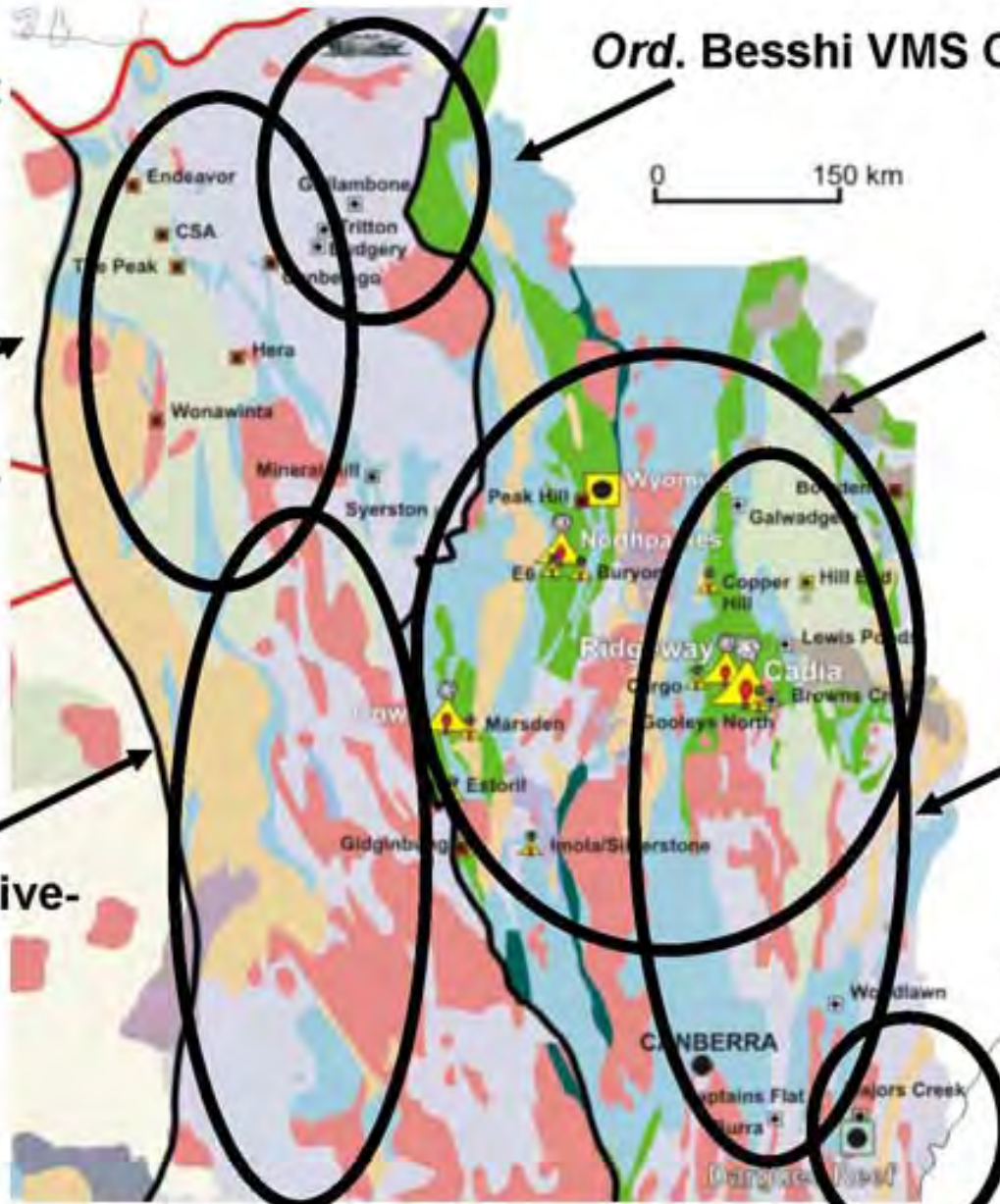
0 150 km

**Ord. porphyry Au-  
Cu province**

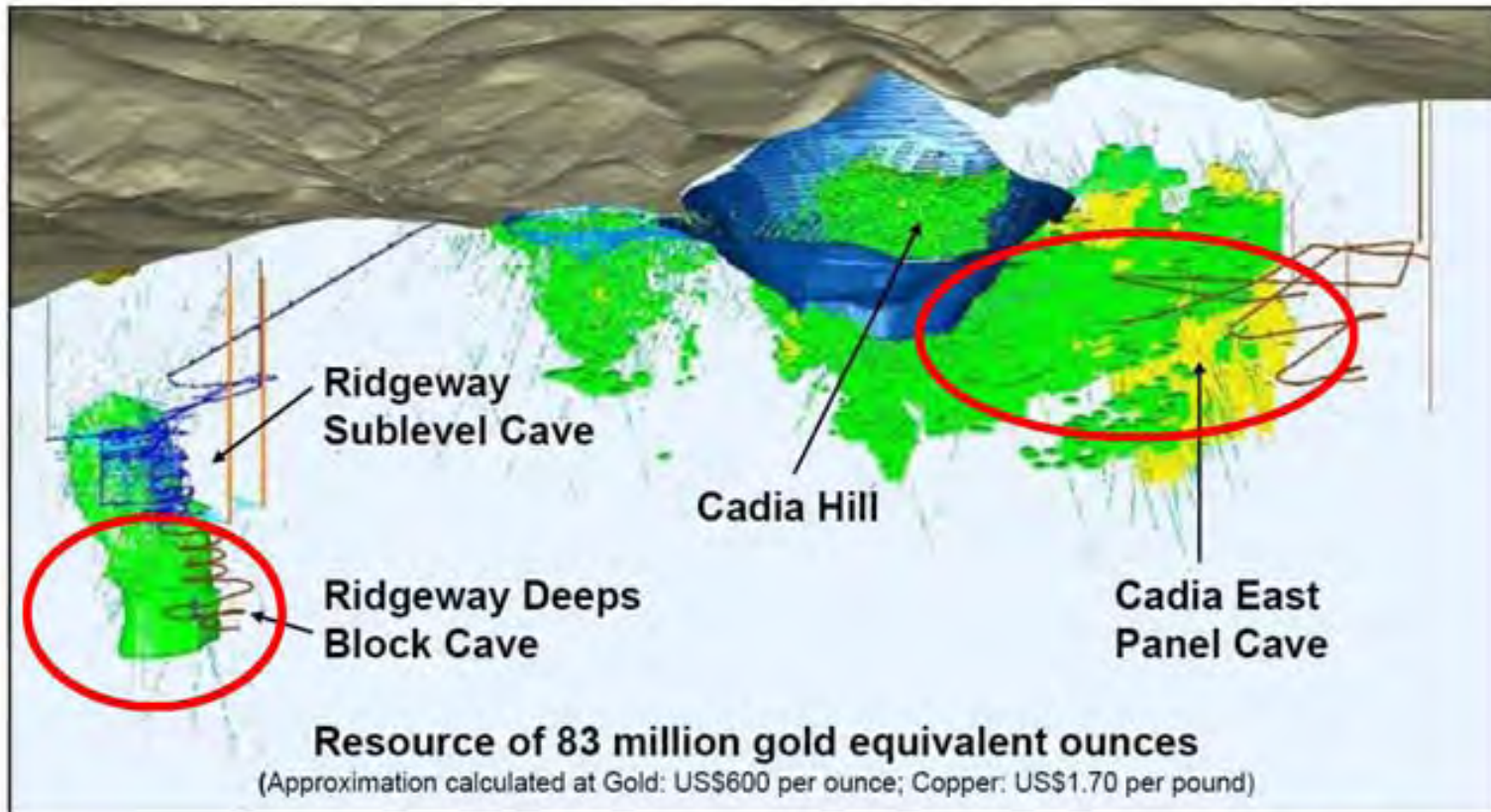
**Sil. VMS Zn-  
Pb-Cu-Au**

**Dev. intrusive-  
related Au**

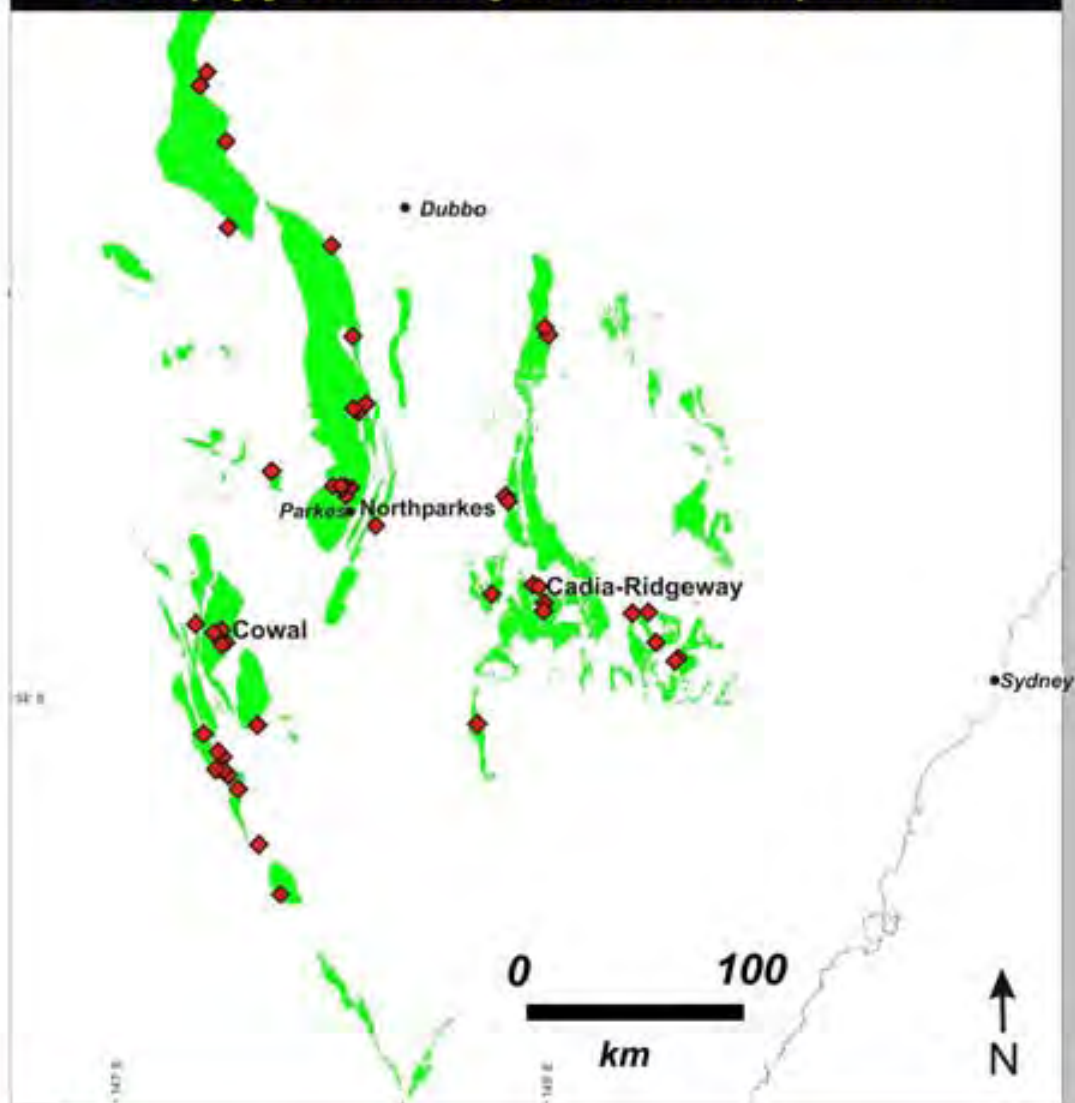
**Ord-Carb orogenic Au**



## Cadia Valley



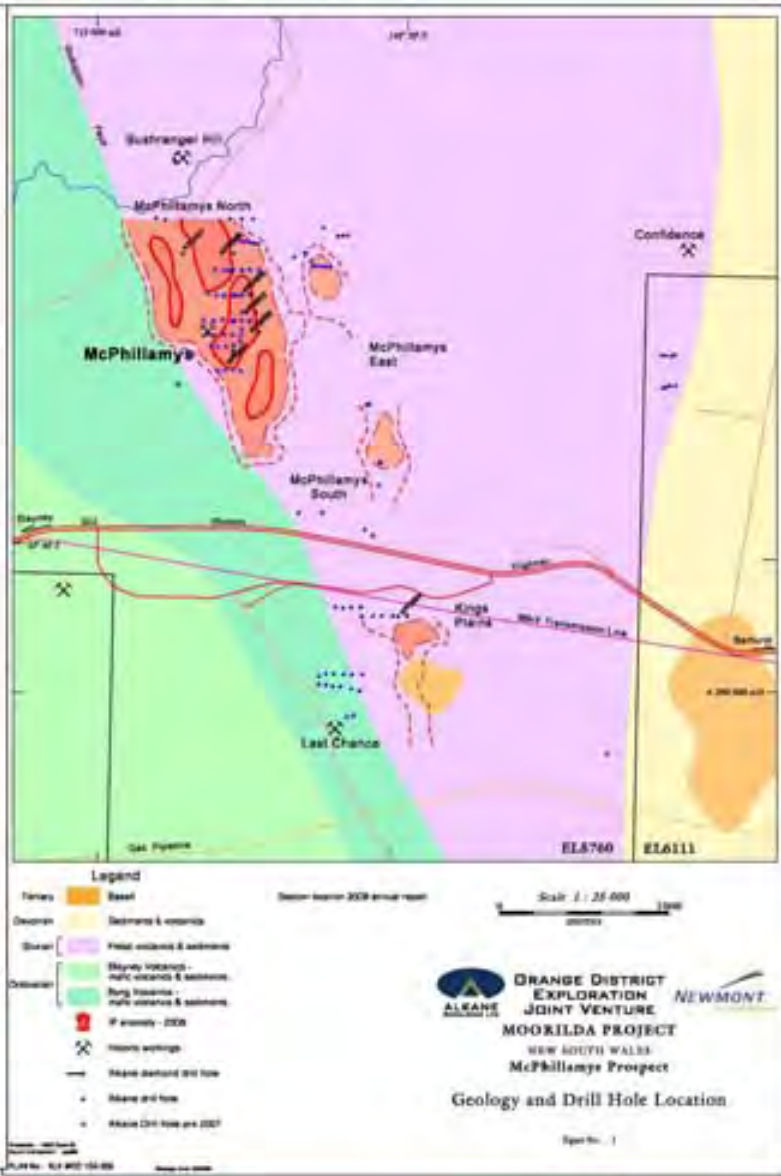
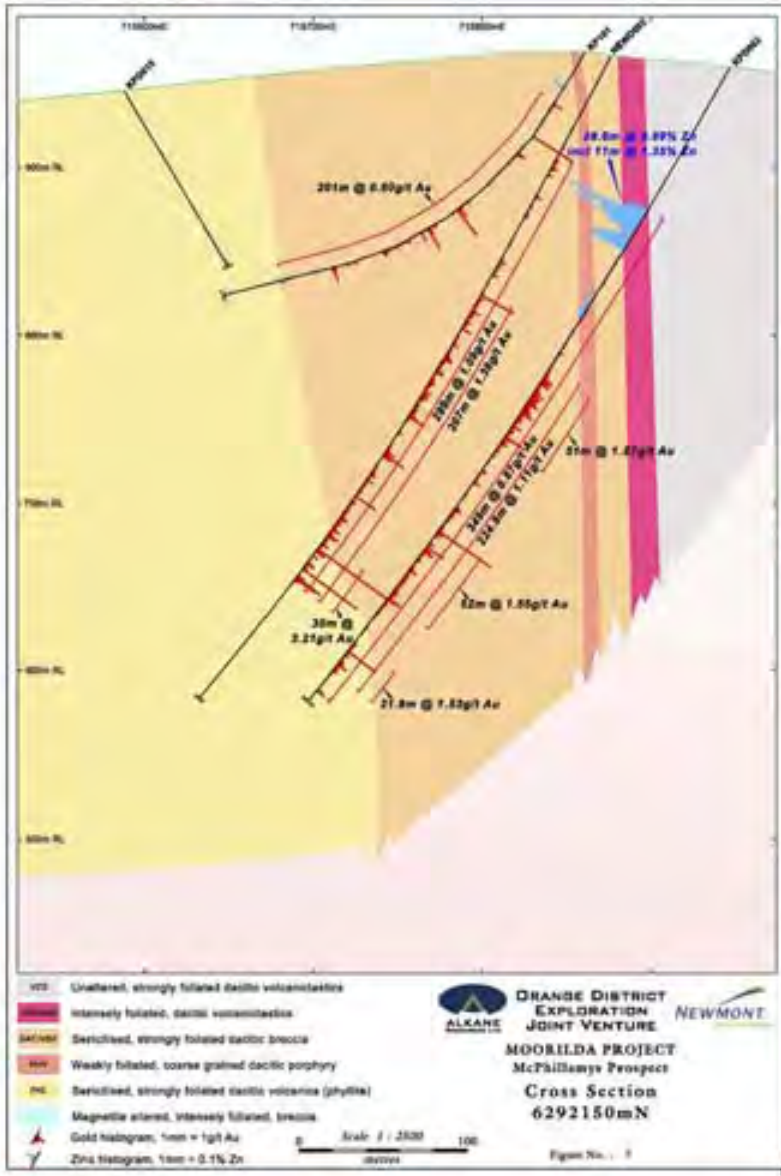
◆ Porphyry & Related Systems of the Macquarie Arc



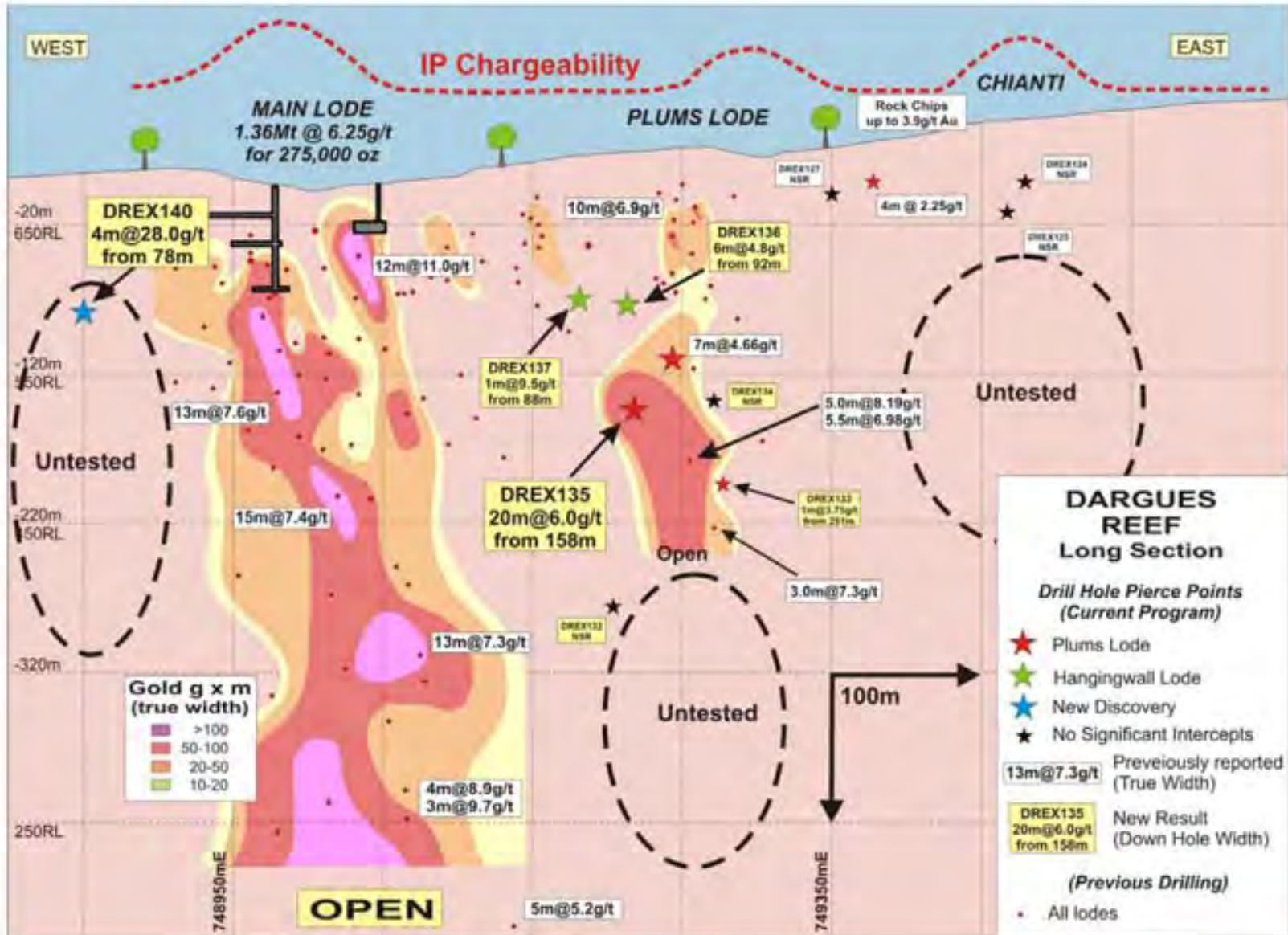
## NEW EXPLORATION CONCEPTS

- **Sub-volcanic Au**
- **Granite-related Au**
- **Big Sn systems**
- **Avebury-style Ni**
- **CID Fe**
- **Delamerian porphyries, VMS, orthomagmatic Ni**
- **Adelaidean MVT Pb-Zn, magnetite Fe**
- **Thomson Orogen - A new mineral province**

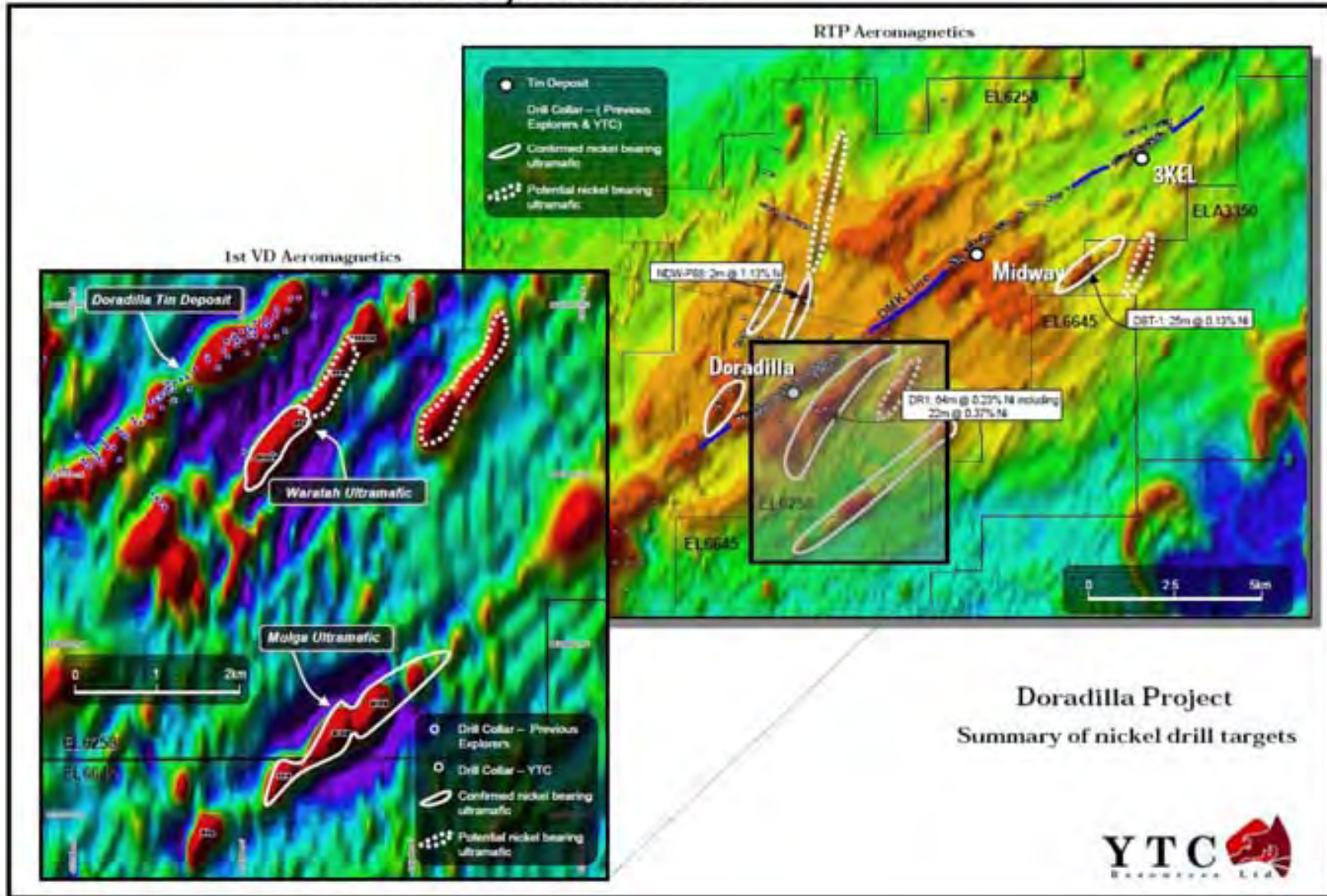
# Sub-Volcanic Au McPhillamy's, Blayney



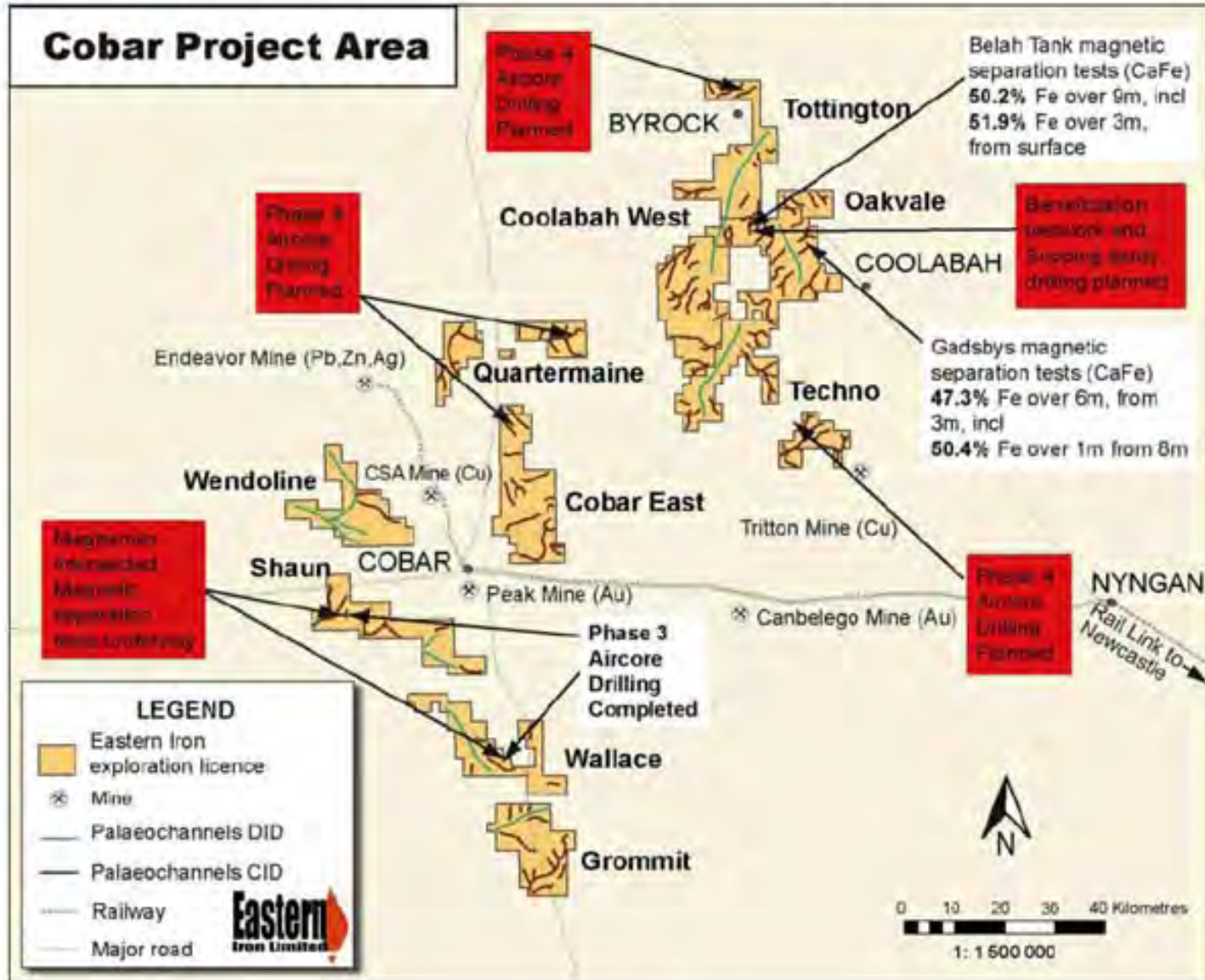
# Intrusive Related Au Dargues reef, Braidwood



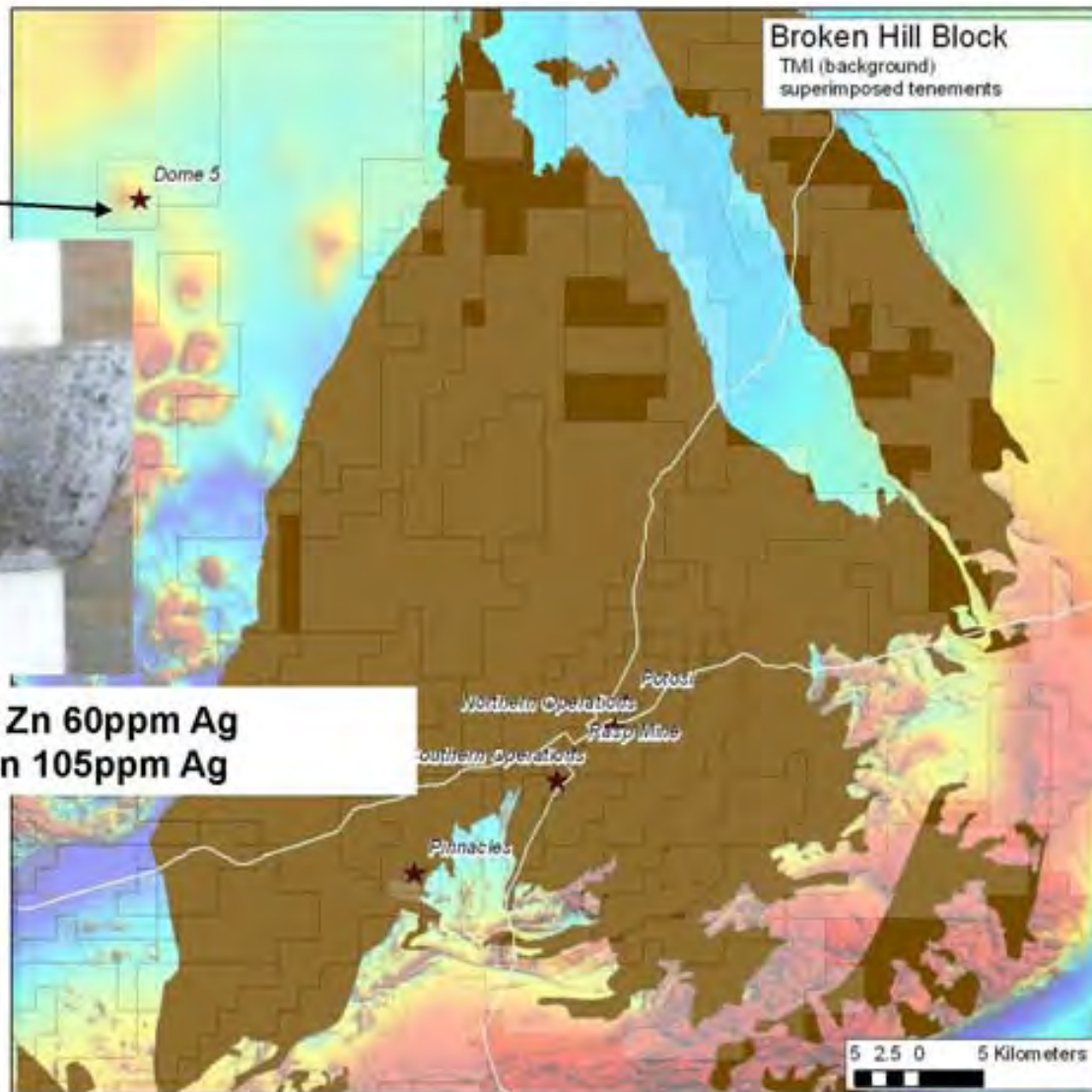
# Skarn Sn, Auebury style Ni Doradilla, Bourke



# Channel Iron Deposits

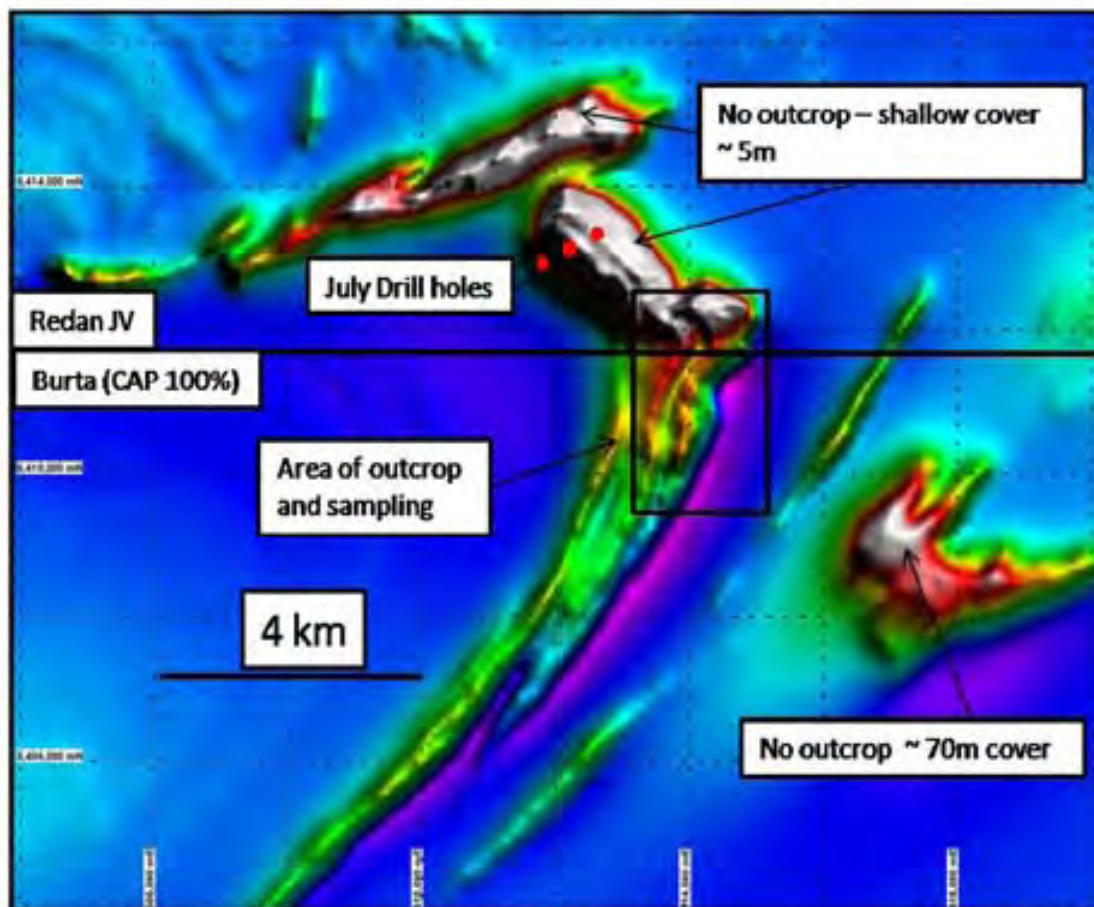


## Adelaidean MVT Zn-Pb

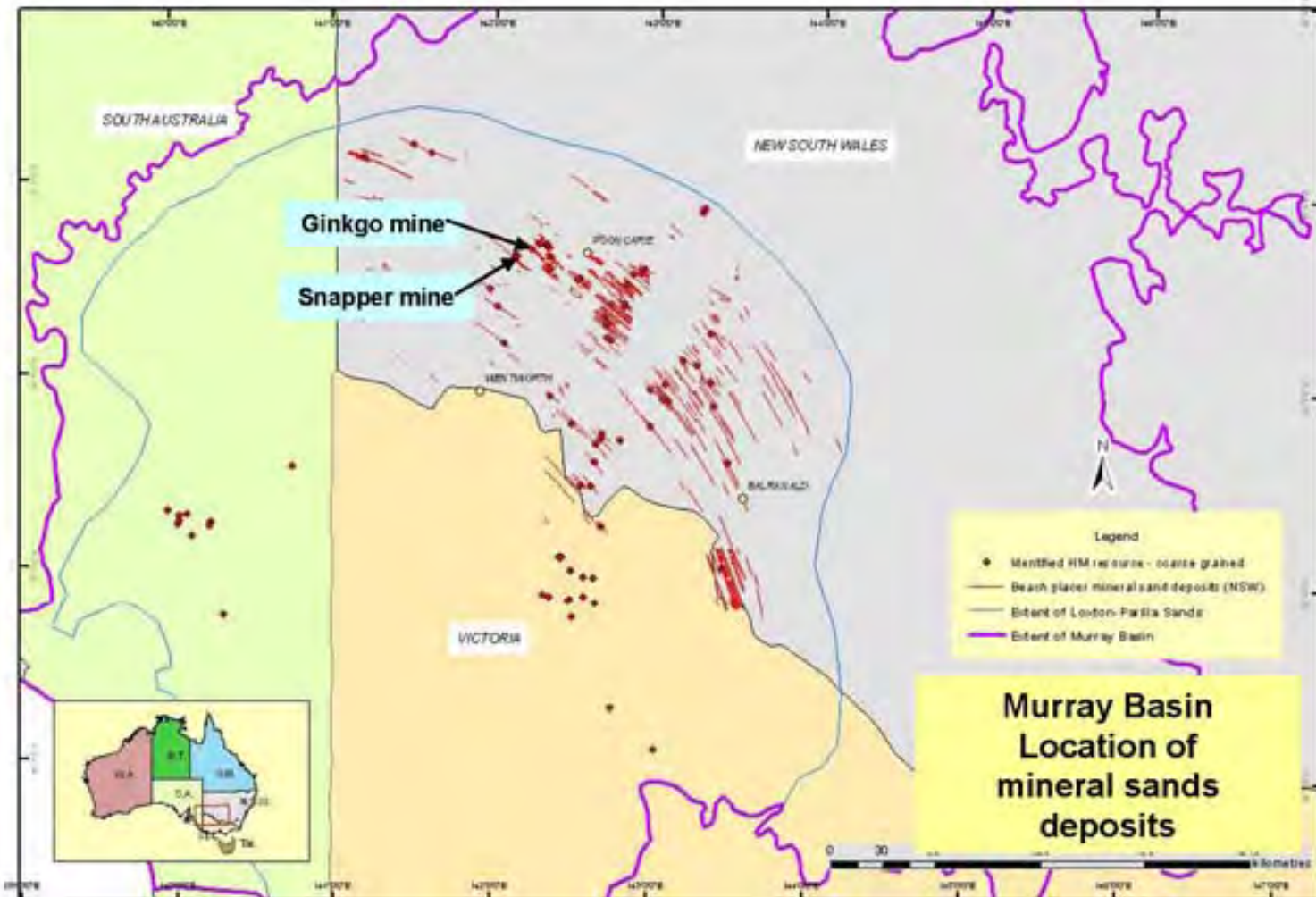


0.67m @3.12% Pb 20.5% Zn 60ppm Ag  
0.33m @18% Pb 0.43% Zn 105ppm Ag

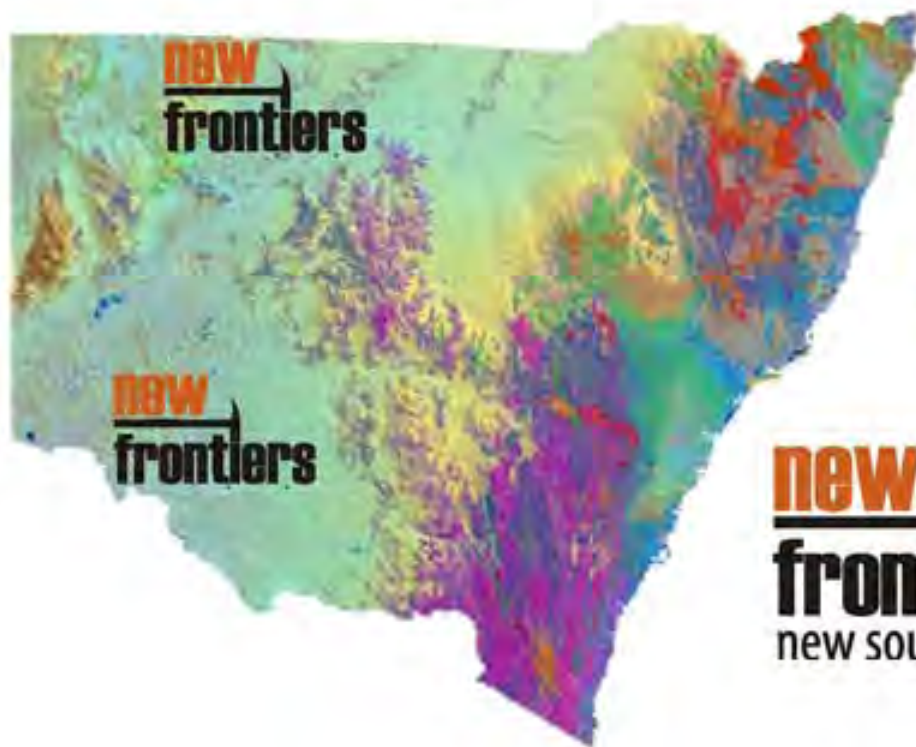
## Adelaidean Magnetite Fe– Hawsons prospect, Carpentaria Exploration







## NSW Government Initiatives



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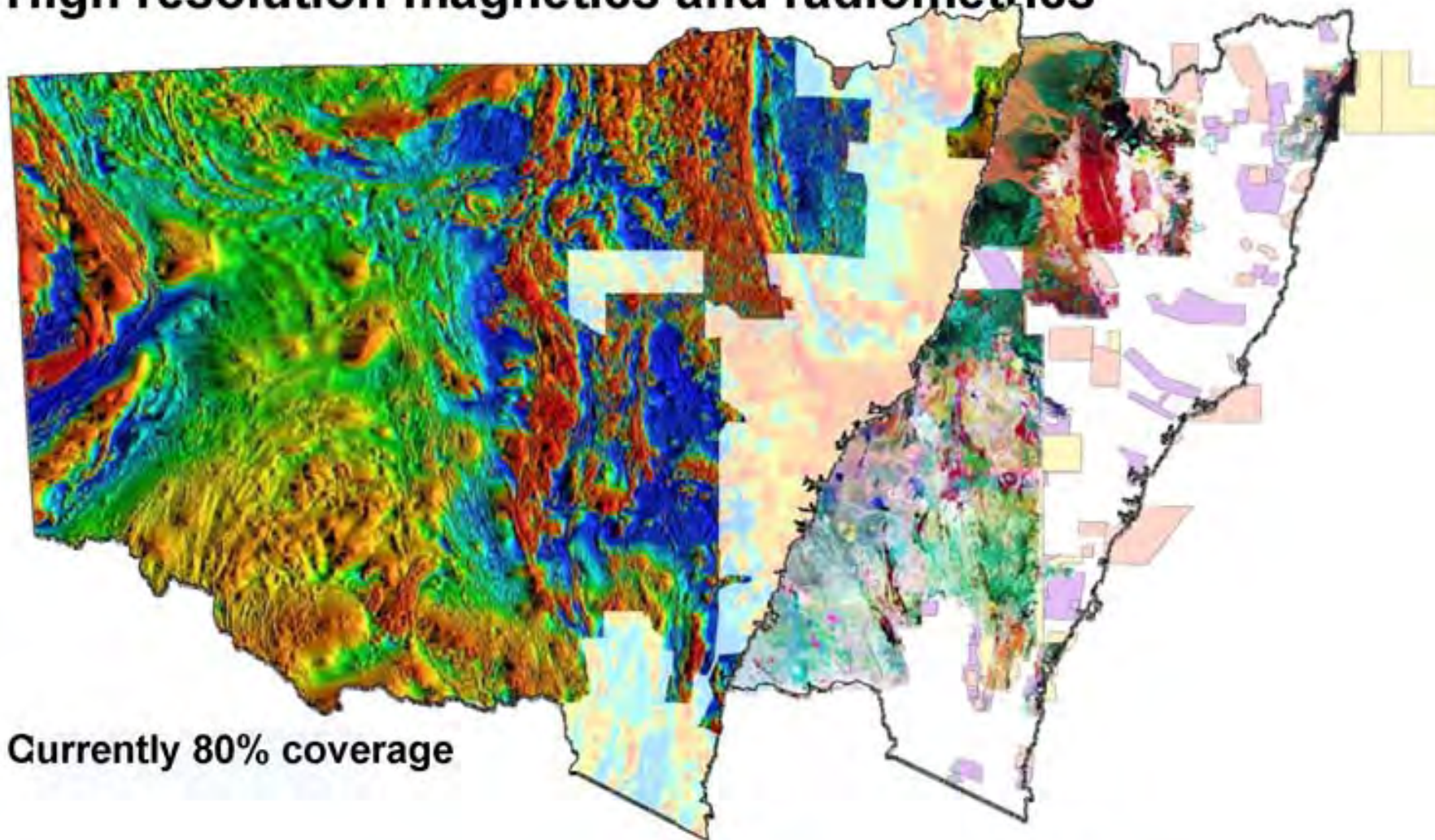
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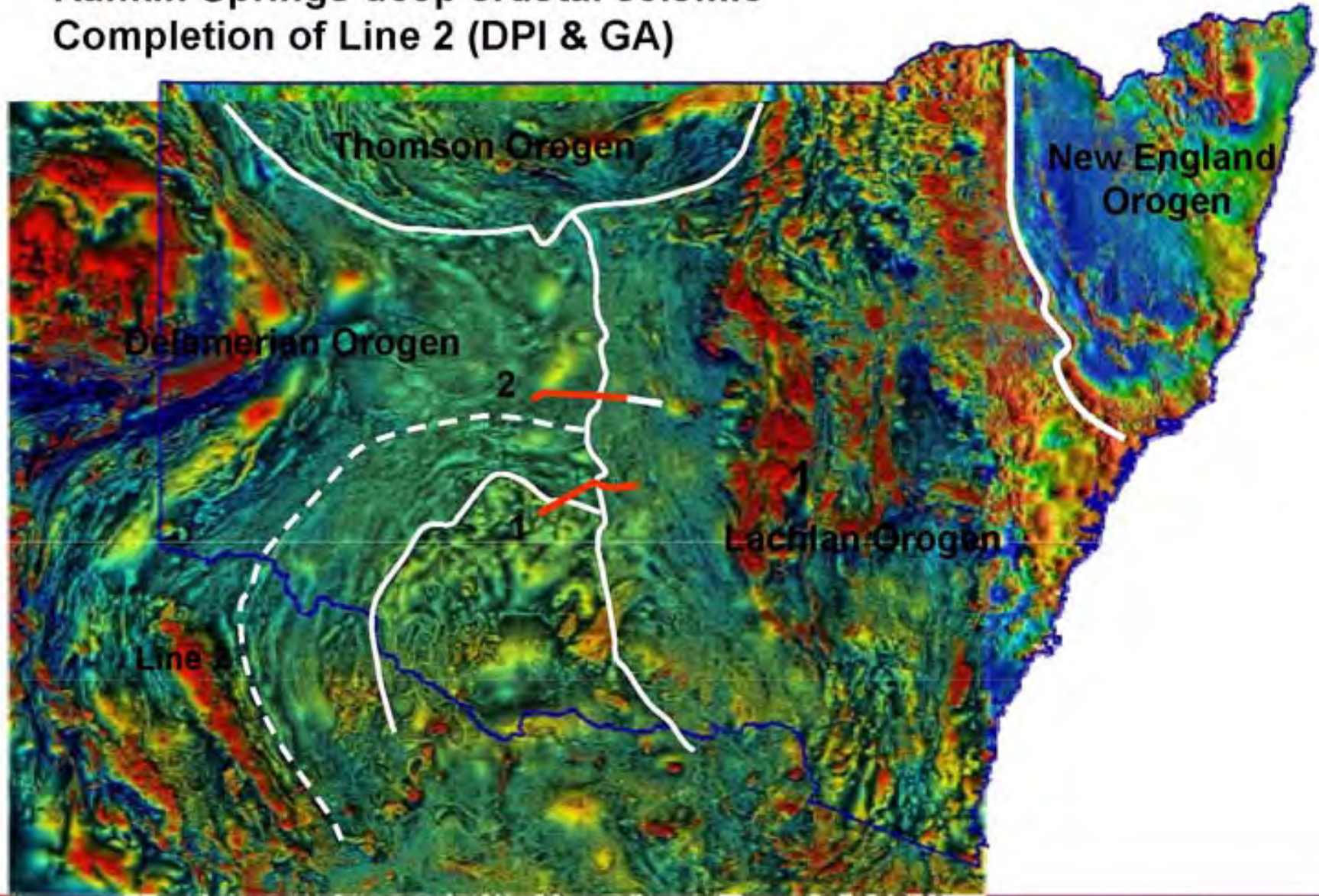
II - 2008 – 2011 (\$16.5 million)

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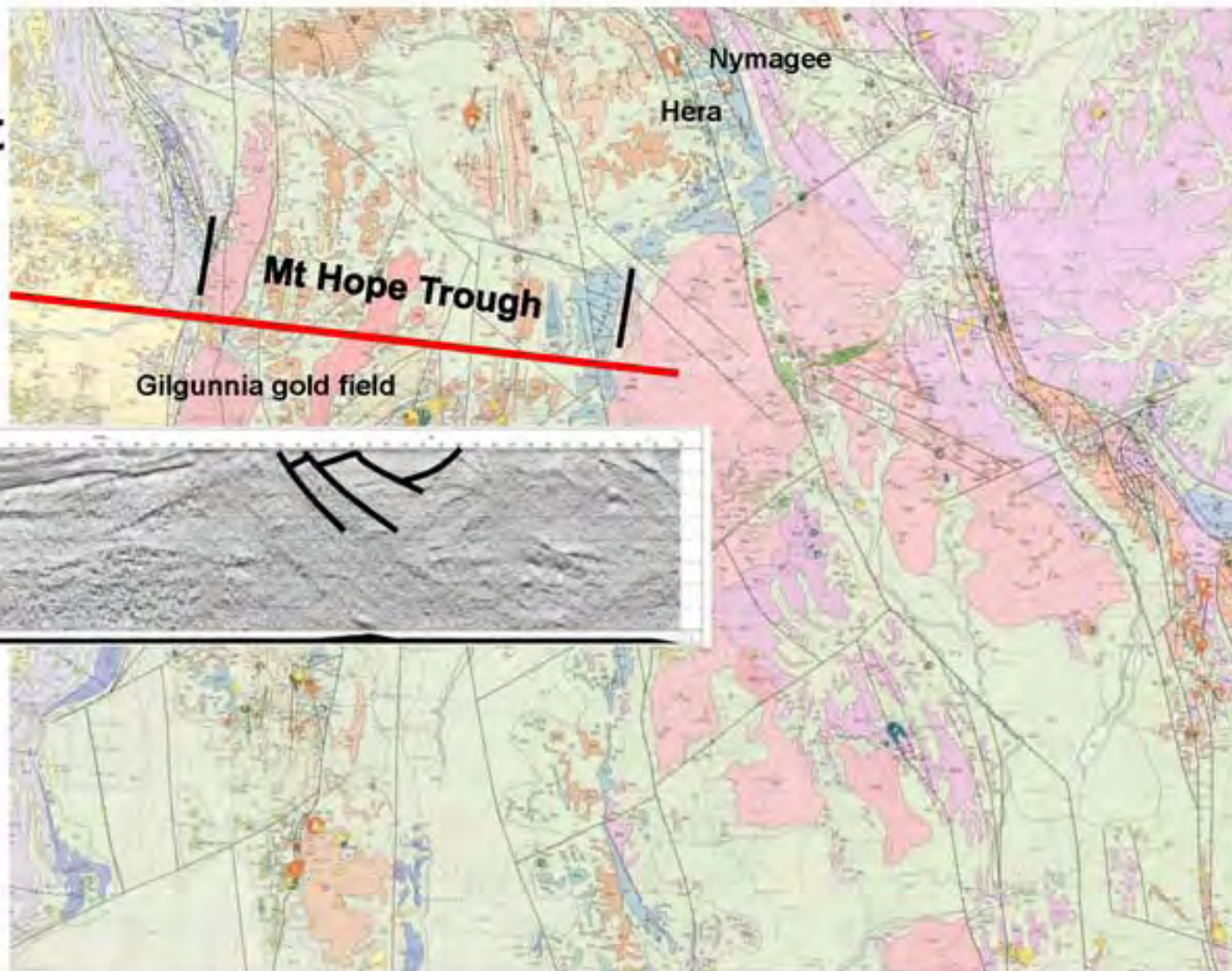
## High resolution magnetics and radiometrics



# Rankin Springs deep crustal seismic Completion of Line 2 (DPI & GA)

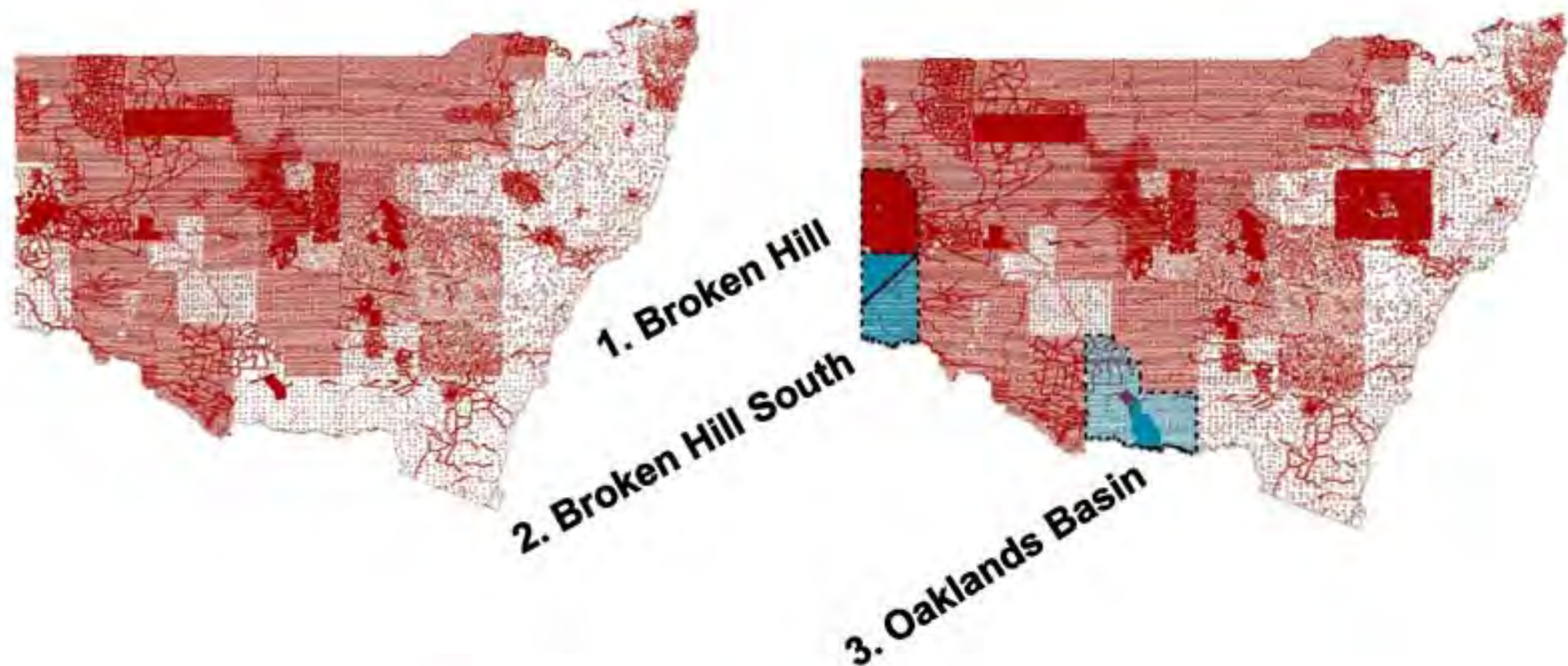


# Nymagee 1:250 000 sheet



# New Gravity Data

2009 – Acquisition of high resolution gravity data for 3 areas (> 4km x 4km)



## Regional Mapping

- Goulburn 1:250,000 and constituent 1:100,000s
- Braidwood 1:100,000
- Moss Vale 1:100,000
- Koonenberry Belt 1:250,000s, 1:100,000s, 1:25,000s, plus 1:100,000 regolith maps
- Cobham Lake, Milparinka, Bourke, Hay, Balranald solid geology 1:250,000s
- Broken Hill 1:25,000 series solid geology
- Milparinka, Urisino, Yantabulla, Enngonia, Cobham Lake, Louth, Bourke 1:250,000 regolith maps



**Preliminary version of Geophysical/Geological Interpretation Map for Bourke, overlain on 1VD TMI RTP image**

**Intrusive units:**

- *detailed mapping of granite types & extents based on their magnetic characteristics*
- *shows succession of emplacement to relate with isotopic age data*
- *aureole effects variable*
- *several regional dyke swarms*
- *Doradilla & DMK line Cu Sn Ni*

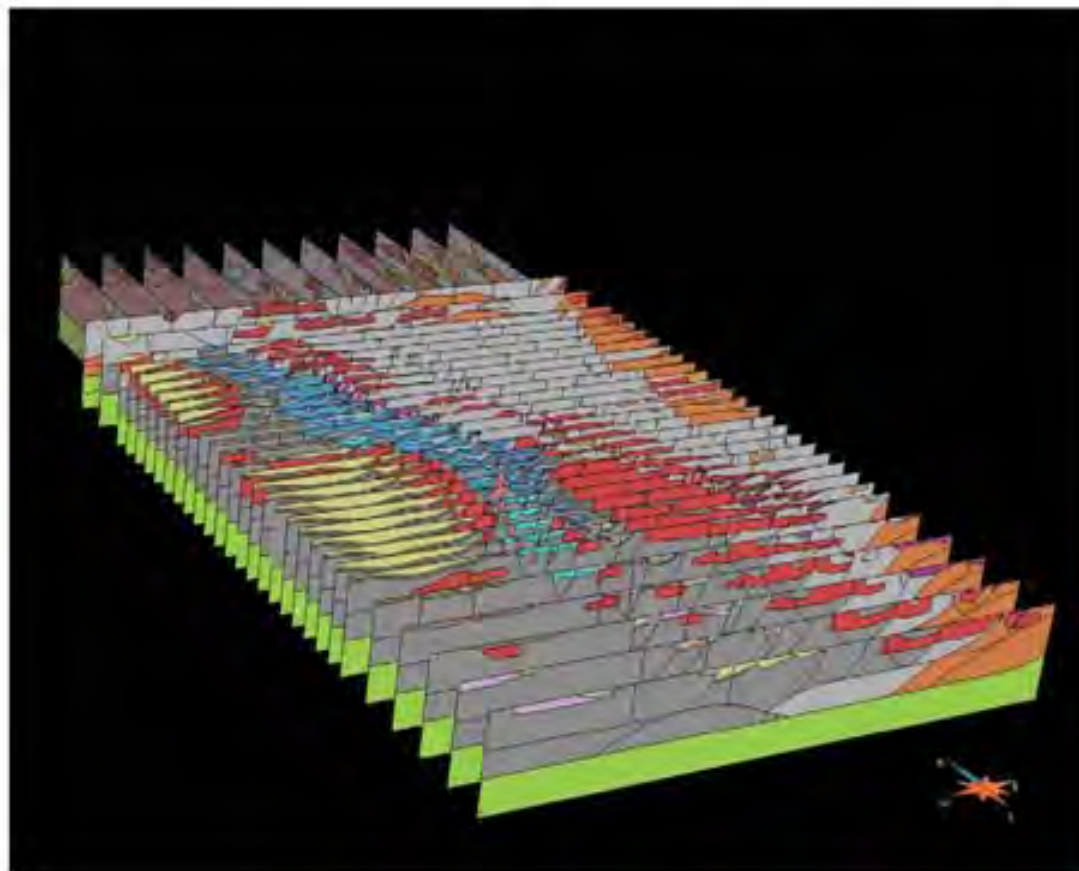
**Metasedimentary units:**

- *previously undifferentiated, with additional recent Byrock mapping*
- *a challenge in recognising*

**Major structures:**

- *transition from Lachlan trends to Thomson trends*
- *use of gravity worms*

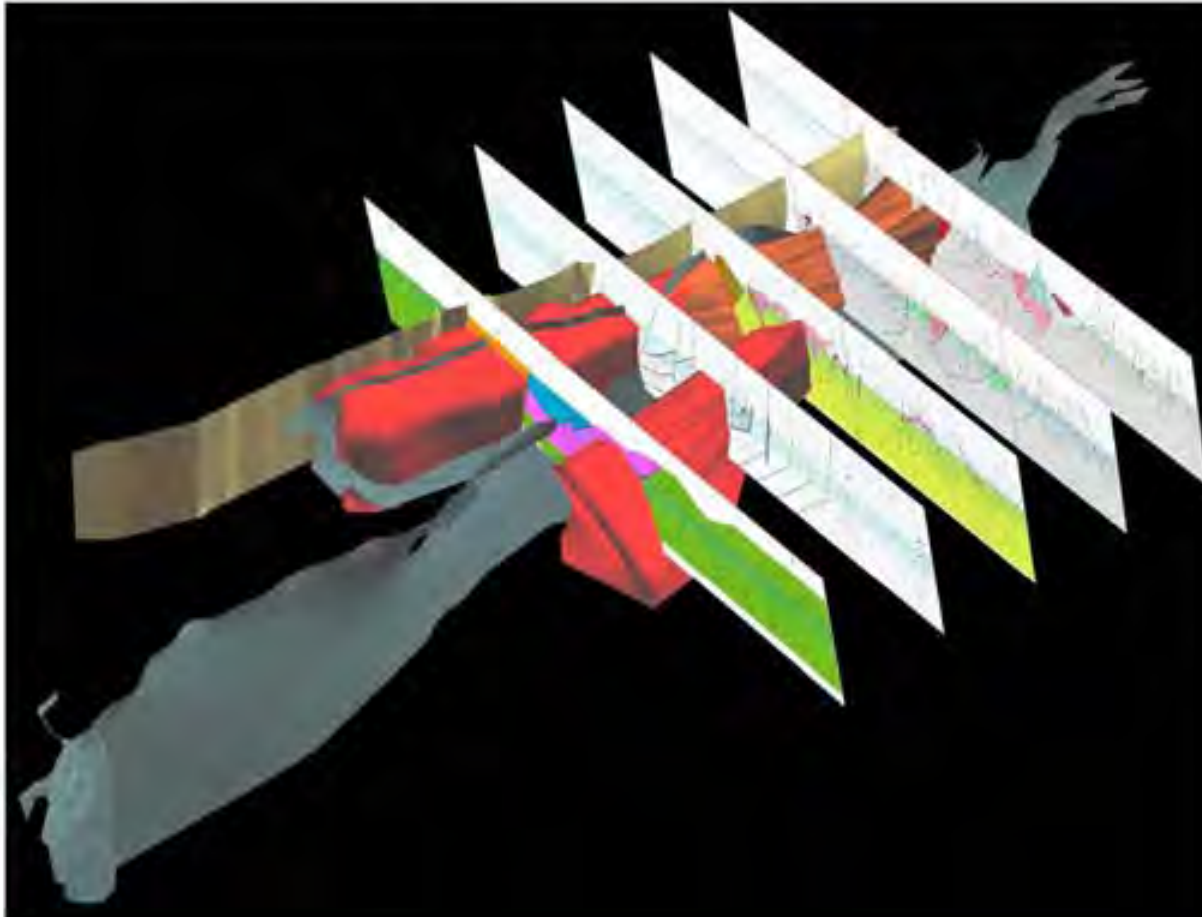
## New Dimensions – 3D mapping @ Cobar



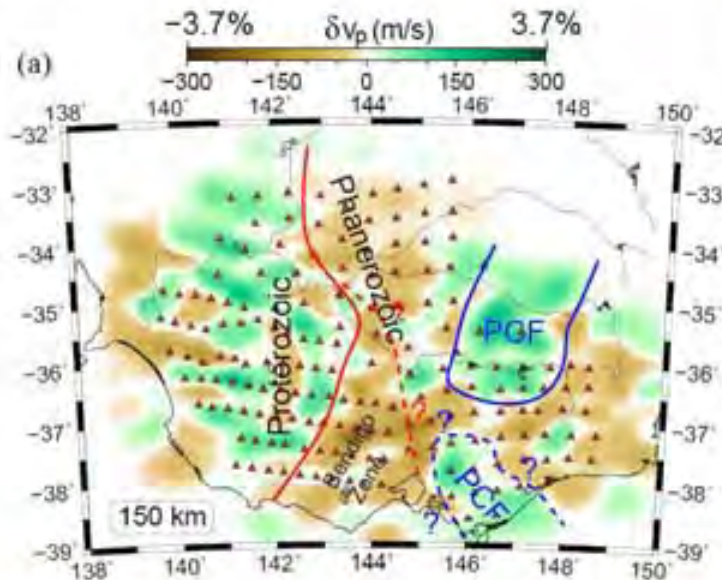
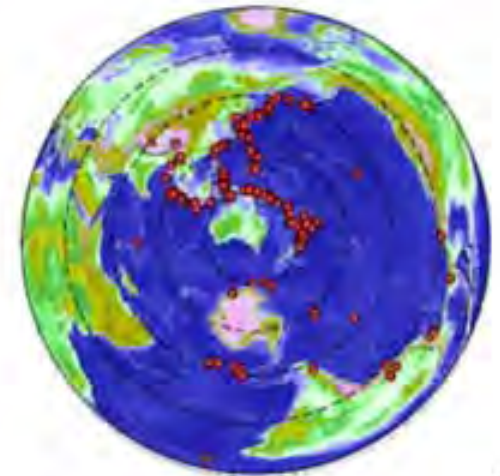
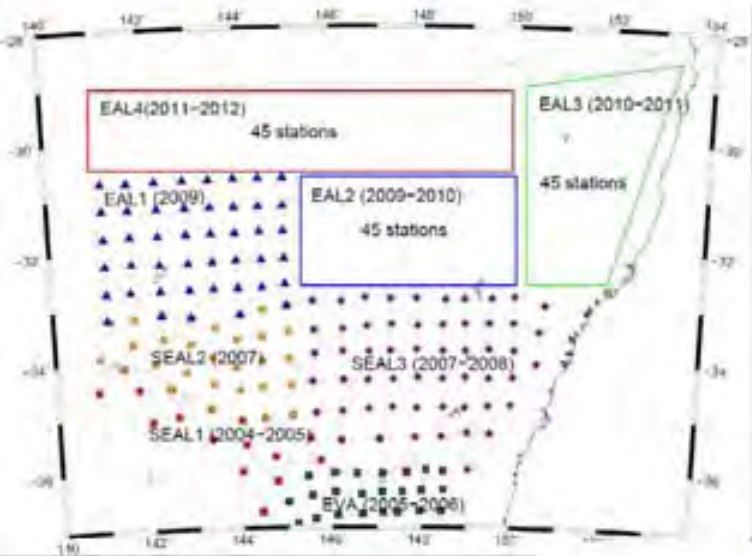
**Cobar 3D  
Project  
with  
PmdCRC**

Regional Map  
Section Surfaces

## New Dimensions – 3D mapping on Braidwood 100k sheet

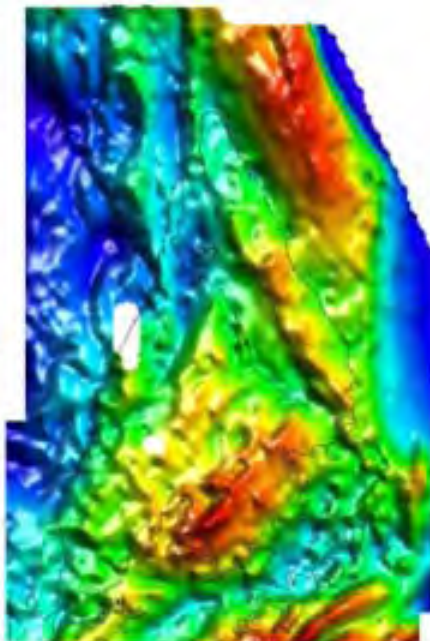


**Inversions of  
gravity data  
fitted to cross  
sections**

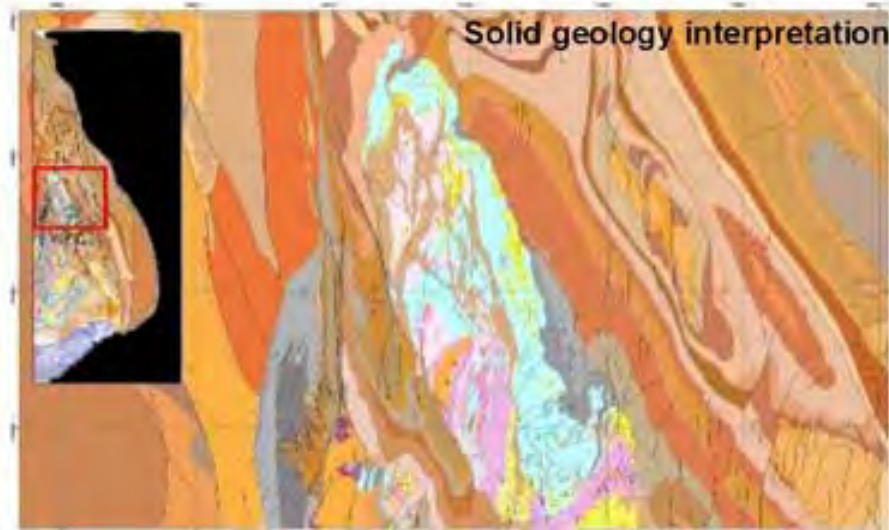


## SEAL 2:

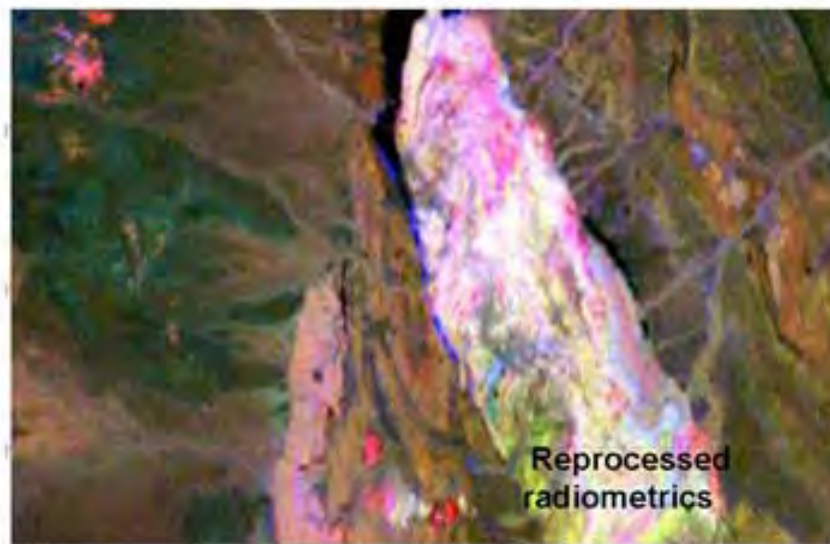
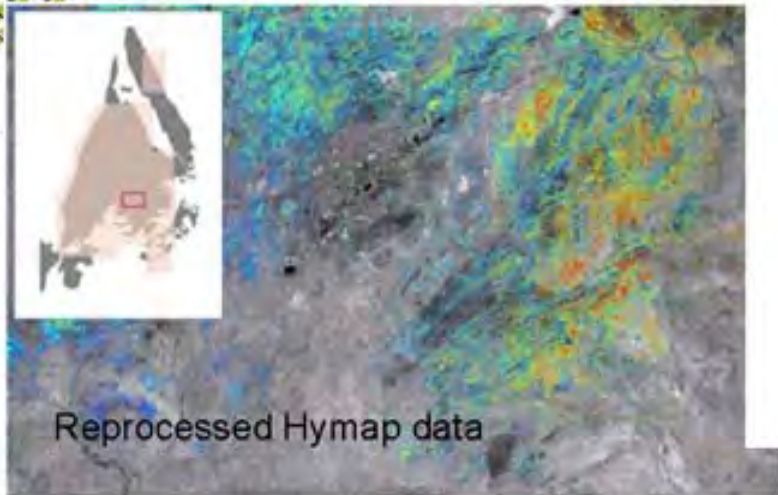
- 187 distant earthquakes
- 31 stations
- 3D view of upper mantle
- Insight into deep geology

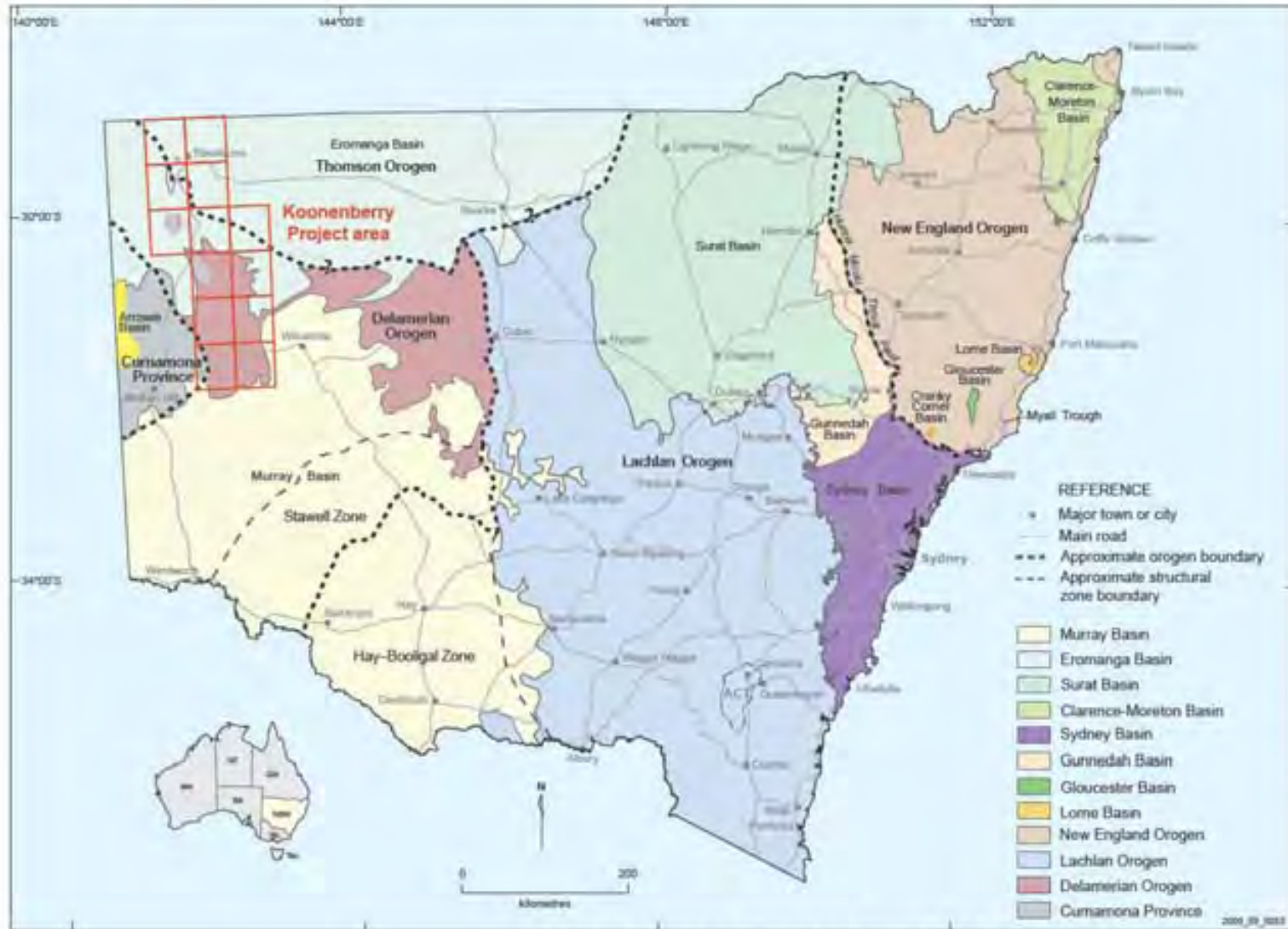


2km grid gravity data



3D Sections





Data to be released at BHEI conference

# DRILL CORE LIBRARIES

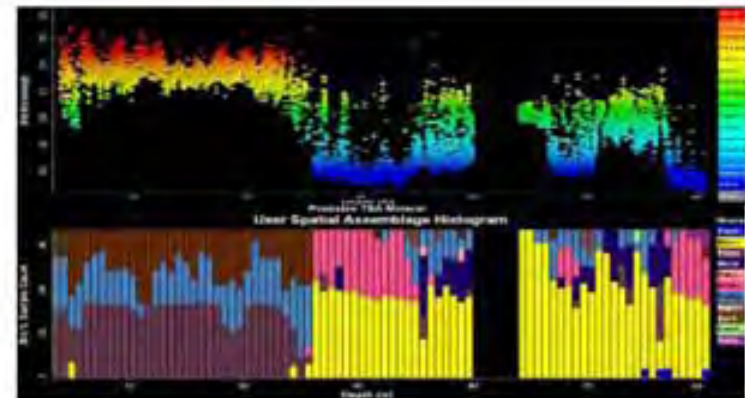
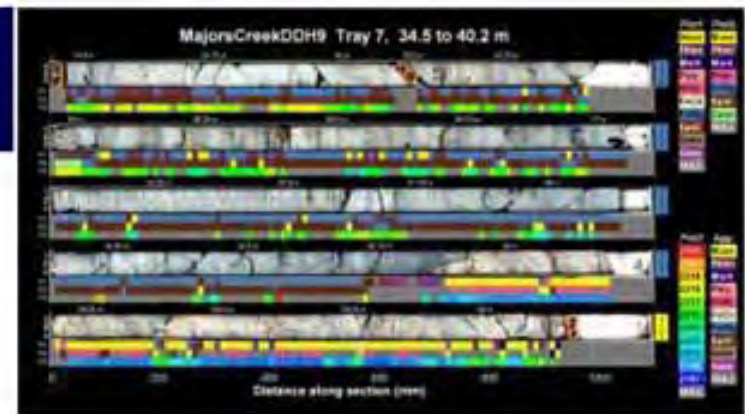


WB Clarke Geoscience Centre,  
Londonderry



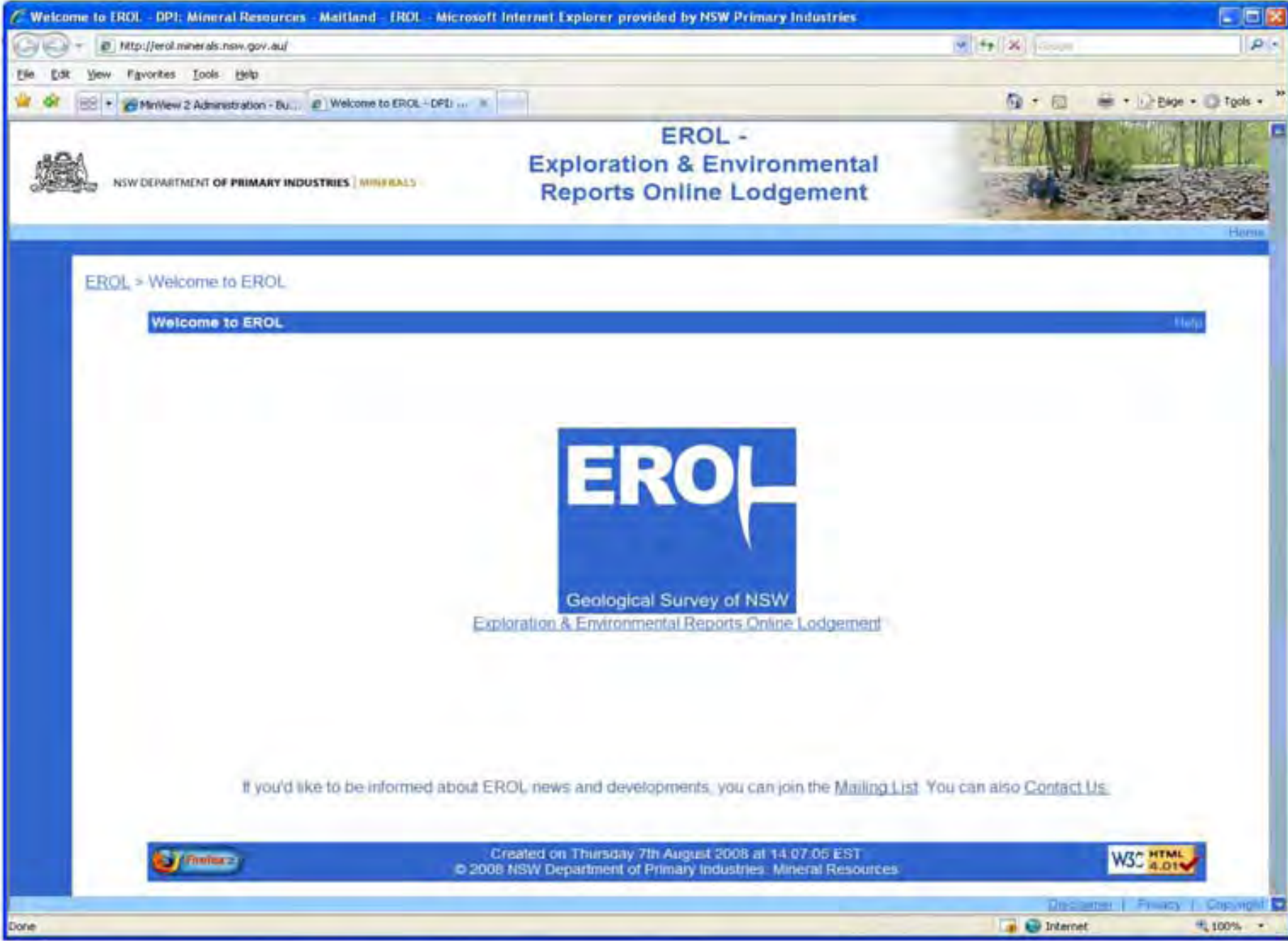
EC Andrews Regional Core Storage  
Facility, Broken Hill

# HyLogger Core Scanner



- NCRIS geoscience funding managed by Auscope
- Instrument installed and fully functioning at Core Library
- In NSW – initial focus on fingerprinting NSW mineral systems
- Facility available for research projects

## Minview 2 – Raster image added to bookmark



# COGENT II – Geoscience Data Management System

- Example 1 – radiogenic isotope data in NSW.
- Previously non-spatial spreadsheets.
- Not routinely up-dated or accessible data.
- Compilation and distribution has already led to discovery of data
- Example 2 – stratigraphic names database.
- Over 12 000 names (3 000 current) in NSW.
- Essential look up table in COGENT II for field observations, mineral occurrences and mapping.
- Will include unit descriptions and other data.



|                |   |
|----------------|---|
| NAME           | Mount Arrowsmith Volcanics.   |
| CODE           | NPgv.   |
| PARENT UNIT    | Grey Range Group.   |
| LITHOLOGY      | Undifferentiated mafic igneous rocks including alkali basalt, trachybasalt, trachyte; submarine and subaerial lava flows, sills and related intrusions; regionally metamorphosed to greenschist facies. |
| AGE & EVIDENCE | Interpreted to be late Neoproterozoic based on a SHRIMP zircon U-Pb age of $585.5 \pm 3.2$ Ma (Black 2007).   |

# Exploration promotion



## ***NSW EXPLORERS DIRECTORY***

- Showcases 57 junior and mid-tier explorers active in NSW
- National and international promotion of NSW
- Team Australia -China, India, Japan, Canada



**JOGMEC**



**CHINA MINING**



**PDAC**

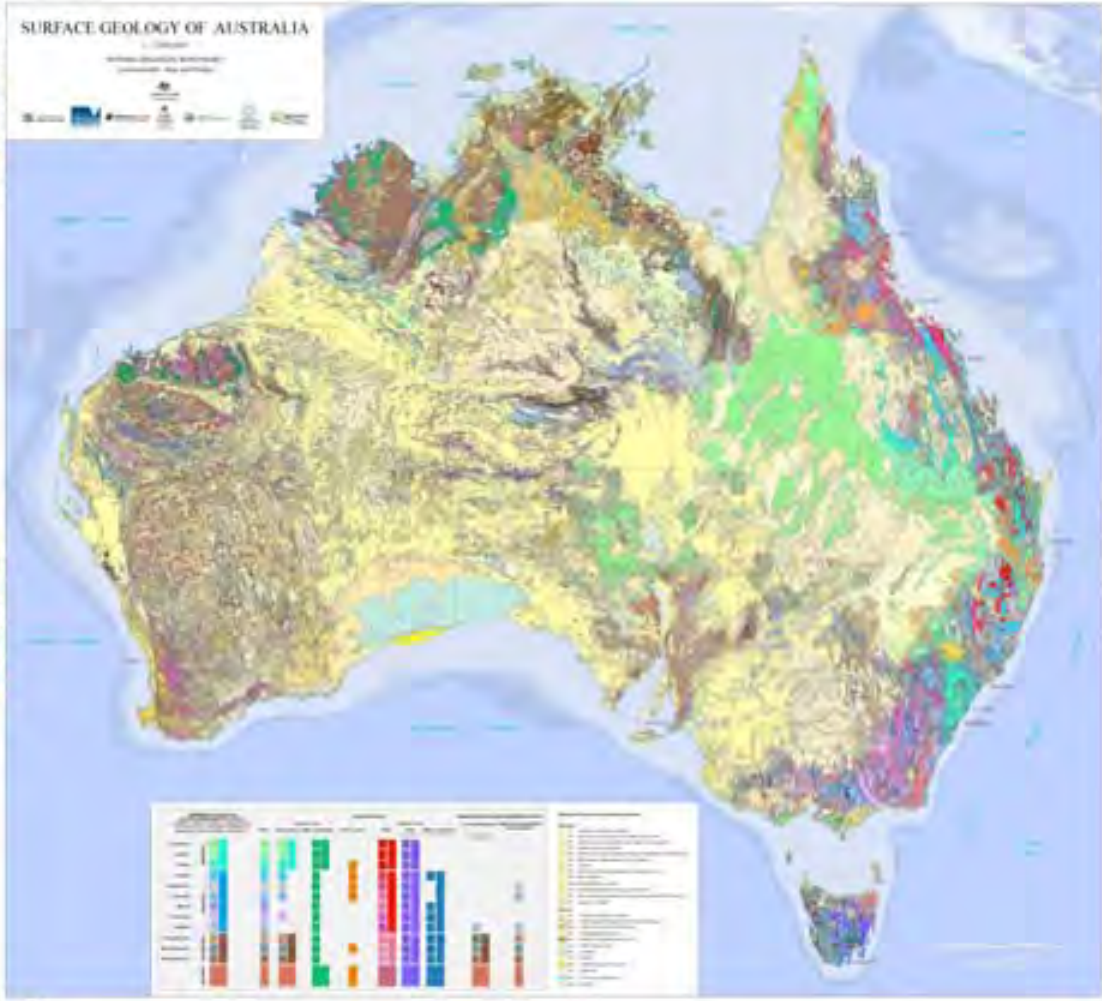
**IN COOPERATION WITH  
"TEAM AUSTRALIA"**

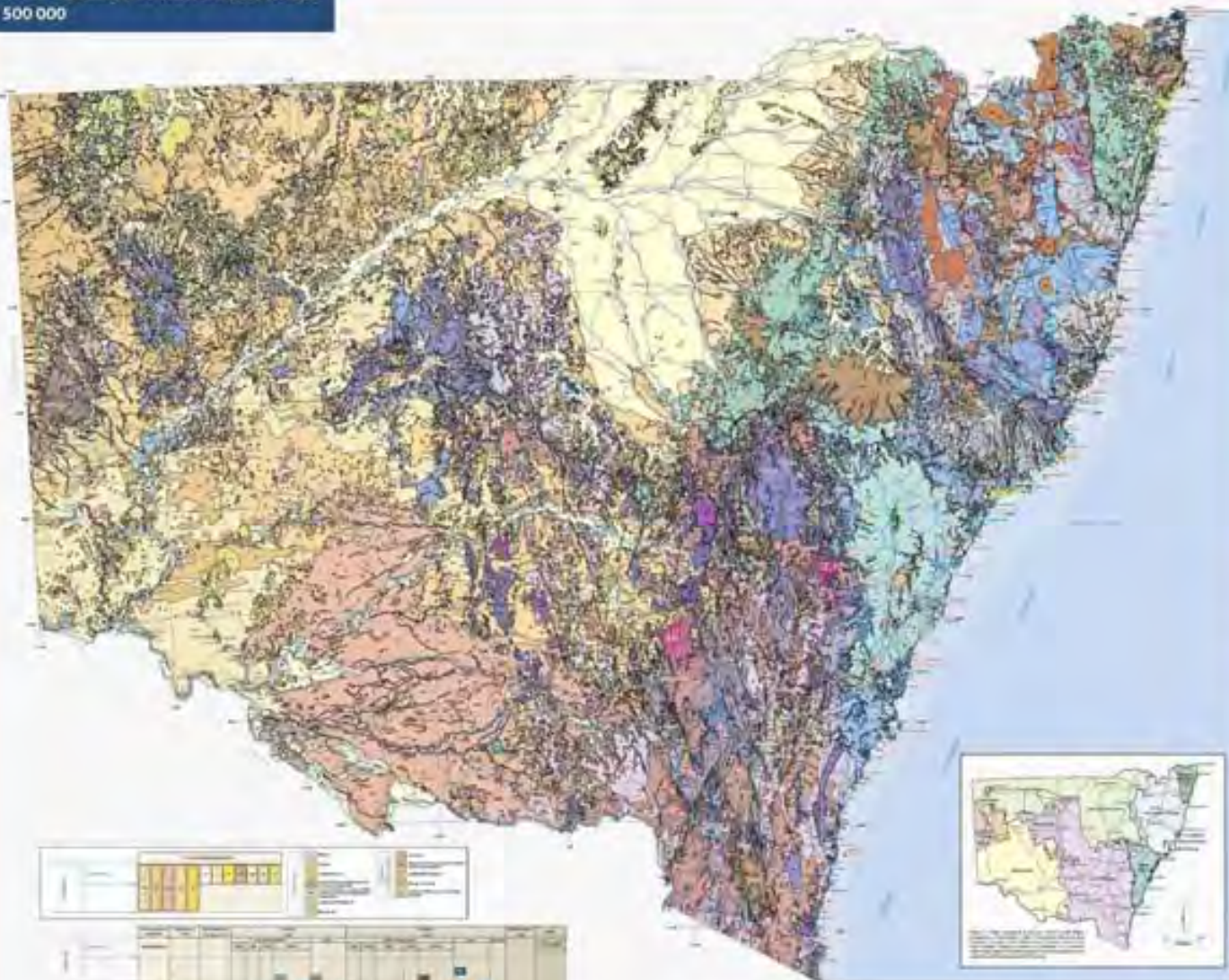
# GEOSCIENCE AUSTRALIA



**SURFACE GEOLOGY OF AUSTRALIA**

This map shows the surface geology of Australia, with a legend and a scale bar. It includes a title, a logo, and a legend with text describing the geological units and their characteristics.





Geological units are defined by their lithology, structure, and age. The map shows the distribution of these units across the state, highlighting major geological features and structures. The map is a key resource for understanding the geological history of New South Wales and for identifying potential mineral resources.



SURFACE GEOLOGY OF NEW SOUTH WALES  
1:1 500 000

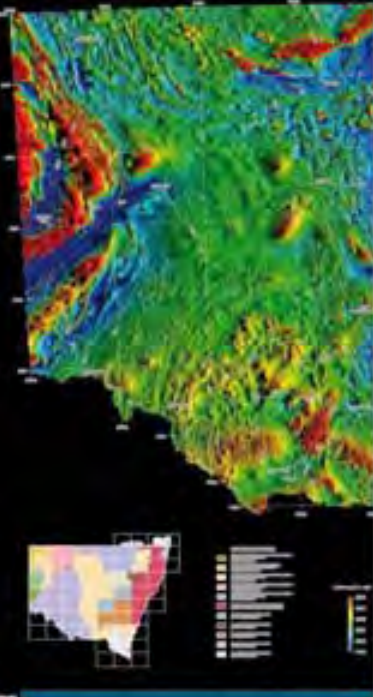


| Unit Name  | Color        | Symbol           |
|------------|--------------|------------------|
| Quaternary | Light Brown  | Horizontal lines |
| Tertiary   | Light Green  | Vertical lines   |
| Cretaceous | Light Blue   | Diagonal lines   |
| Jurassic   | Light Yellow | Stippled         |
| Permian    | Light Purple | Horizontal lines |
| Triassic   | Light Orange | Vertical lines   |
| Devonian   | Light Green  | Diagonal lines   |
| Silurian   | Light Blue   | Stippled         |
| Ordovician | Light Yellow | Horizontal lines |
| Cambrian   | Light Brown  | Vertical lines   |



# State 1:1,500,000 Geophysics

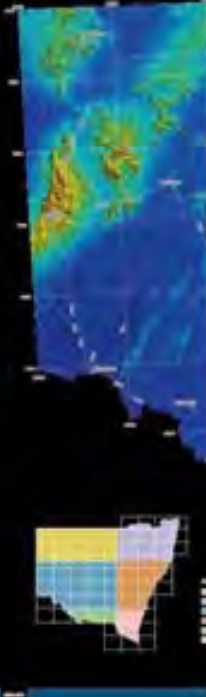
MAGNETIC MAP OF NEW SOUTH WALES 2007  
1:1 500 000



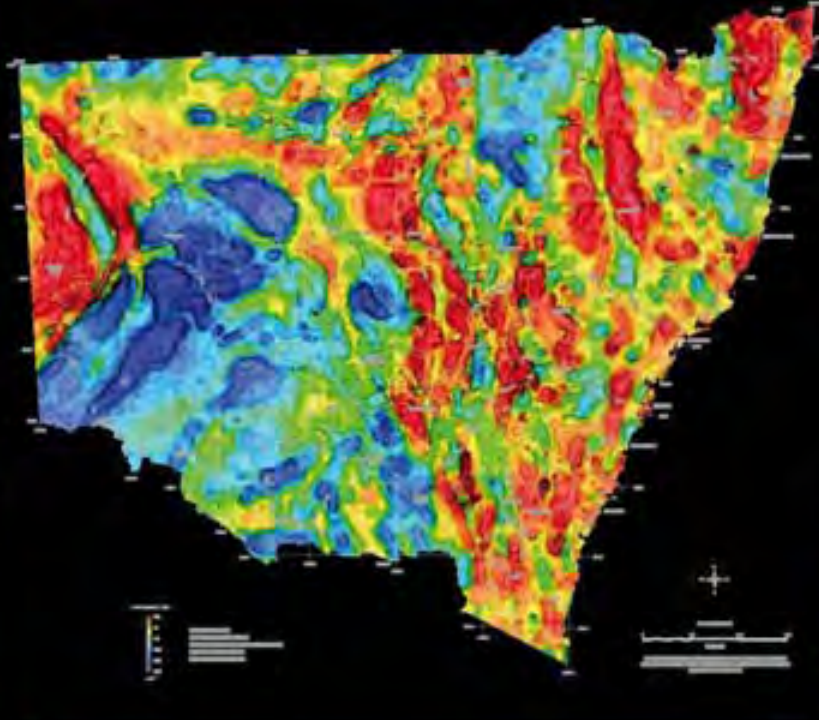
TERNARY RADIOELEMENT MAP OF NEW SOUTH WALES 2007  
1:1 500 000



SRTM DEM MAP OF NEW SOUTH WALES 2007  
1:1 500 000



GRAVITY MAP OF NEW SOUTH WALES 2007  
1:1 500 000





MINERAL RESOURCE PROJECTS  
NEW SOUTH WALES  
1:1 500 000



| PROJECT BY REGION |              | GEOGRAPHICAL BY REGION |              |
|-------------------|--------------|------------------------|--------------|
| North West        | Central West | North West             | Central West |
| South West        | South East   | South West             | South East   |
| Other             |              | Other                  |              |

# THANK YOU

